REMARKS

The specification is amended to provide the descriptions of the individual figures as the Examiner required. Claims 55, 57 and 59-61 are canceled without prejudice. Claims 48 and 58 are amended; marked up versions of the amended claims are attached hereto pursuant to 37 C.F.R. § 1.121(c)(ii). New claims 62 and 63 are added in this amendment. Claims 37-54, 56, 58, 62 and 63 are now pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

Applicant believes the foregoing amendments comply with requirements of form and thus may be admitted under 37 C.F.R. § 1.116(a). Alternatively, if these amendments are deemed to touch the merits, admission is requested under 37 C.F.R. § 1.116(b). In this connection, these amendments were not earlier presented because they are in response to the matters pointed out for the first time in the Final Office Action.

Lastly, admission is requested under 37 C.F.R. § 1.116(a) as presenting rejected claims in better from for consideration on appeal.

The specification was objected to because each figure must be separately listed. Appropriate amendment has been made to correct this informality.

Claims 59-61 (as they depend from claim 58) were rejected under 35 U.S.C. § 112, first and second paragraphs. These rejections are moot in view of the cancellation of these claims.

Claim 48 was rejected as being indefinite because the scope of the term "and their derivatives" is uncertain. Claim 48 has been amended to remove this language.

Claim 55 was rejected as being indefinite. This rejection is moot in view of the cancellation of this claim.

In paragraphs 8-11 of the Office Action, claims 57 and 58 were rejected as being anticipated by Jonas USP 6,004,483; claims 57-61 were rejected as being anticipated by Jonas USP 5,766,515; claims 57 and 59-61 were rejected as being anticipated by Heeks; and claims 59 and 60 (as they depend from claim 58) were rejected as being anticipated by Shi. The rejections of claims 57 and 59-61 are moot in view of the cancellation of these claims. The rejections of claim 58 over Jonas '483 and '515 are respectfully traversed.

Claim 58 is directed to a composition used for forming a pattern formation of a hole injecting and transporting layer of an organic EL element using an ink-jet recording head. The composition comprises at least a material for a hole injecting and transporting layer and a polar solvent as a solvent. The claim is amended to specify the viscosity and surface tension properties of the composition. As explained in the specification (see page 6, last lien to page 10, line 2), the viscosity and surface tension properties are important for its intended use with ink-jet printing apparatus. Appropriate selection of these physical properties prolongs the "flushing time" for the ink-jet printing apparatus, produces more uniform dot density, and enhances the linearity of flight and facilitates control of the ink-jet apparatus (see page 9).

The Jonas references describe a composition for a conductive coating that contains polythiophene and water as a solvent. The references do not describe the physical properties of the composition such as viscosity or surface tension, and therefore does not anticipate claim 58. Further, claim 58 is not obvious from the Jonas references. Although the '515 reference mentions that the coating can be produced by gravure printing and silk screen printing, ink-jet printing is not described. Because the physical properties of the claimed composition is important to its intended use in an ink-jet printing method, and because the Jonas references do not suggest ink-jet printing, it would not have been obvious from the Jonas

references to produce compositions with the claimed physical properties. Thus, claim 58 is patentable over the Jonas references.

Claims 37-47, 52-53 and 56-60 were rejected as being obvious over Liu '407 in view of Cao '281 and Jonas '515; claims 48-51 were rejected as being obvious over Liu in view of Cao, Jonas '515 and further in view of Taniguchi '572; and claims 54 and 56 were rejected as being obvious over Liu in view of Cao and Jonas '515 and further in view of Jonas '483. These rejections are respectfully traversed.

Independent claim 37 is directed to a method of manufacturing an organic EL element having a stacked structure including a hole injecting and transporting layer and a light-emitting layer formed within a partitioning member which is divided into individual pixel areas. The method includes forming the partitioning member on a substrate, filling the openings of the partition members with a composition for the hole injecting and transporting layer using an ink-jet recording head, and drying the composition to form the hole injecting and transporting layer. The composition contains a conductive material containing at least polyethylenedioxythiophene and polystyrene sulfonic acid, and a solvent.

In rejecting claim 37, the Examiner relied on a combination of Liu, Cao and Jonas '515. The applicant respectfully submits that it would not have been obvious to combine the three references; and even if they are combined, one would not have arrived at the claimed method.

Liu describes a method of forming a luminescent device such as a CRT or flat panel display which has a black matrix separating the pixels. The method includes forming the black matrix 2, which is in the form of protrusions formed on the substrate, depositing (by sputtering) a layer of ITO over the entire surface including the black matrix and the pixel areas, and removing the ITO layer from the top surface of the black matrix to form electrical contacts in the pixels (col. 2, line 66 to col. 3, line 16). Colored phosphors are then deposited in the pixel areas in an

electrophoresis process using the ITO as electrodes. It can be seen that in the Liu method, the black matrix is not used as separations for liquids; in other words, liquid is not filled in the openings formed by the black matrix. The ITO layer is sputtered on the entire surface including the top of the black matrix. Liu does not describe the use of ink-jet printing apparatus.

Moreover, Liu's method is not for forming an organic EL device and he does not teach a composition of PEDT and PSS in a solvent as the hole injecting and transporting layer. Cao is relied on for teaching that the anode of an EL device can be an inorganic material (including ITO) or an organic material (including polythiophene) (col. 10). While the applicant acknowledges that such organic material was known, the present invention focuses on the method (ink-jet method) for forming the hole injection and transport layer and compositions that are suitable for the method. While Cao lists the materials useful for the anode layer, Cao does not teach or suggest the methods for forming the anode, or which method would be suitable for which material. Liu uses sputtering to deposit the ITO, which would not be a suitable method for polythiophene. Thus, neither Liu nor Cao teaches or suggests how the two methods could be combined. Further, neither Liu nor Cao teaches or suggests using an ink-jet printing apparatus.

Jonas describes a conductive coating composition containing polythiophene and PSS in a solvent such as water. Jonas states that the coating can be produced "by spraying, application by a doctor blade, dipping, application with roller applicator systems, by printing processes such as gravure printing, silk screen printing, curtain casting." Based on this statement, the Examiner asserted that "although ink-jet printing is not explicitly disclosed, ink-jet printing is a notoriously well-known printing method. Therefore, it would have been obvious ... to have used ink-jet printing to have deposited the polythiophene film in the EL device suggested by '407 and '281 with a reasonable expectation of success."

The applicant respectfully disagrees with the Examiner's conclusion of obviousness. The Examiner appears to assume that all printing methods are interchangeable and can be applied to the Liu process to form the electrode. The applicant strongly disagrees. Different printing methods are significantly different in terms of principle, process, and applicability to different types of media. For example, photoelectric printing would probably not be applicable to a process like Liu's. Gravure printing and silk screen printing mentioned in Jonas would also seem to be incompatible with the Liu process. In Liu (as well as in the presently claimed process), the electrode layer is formed after the black matrix is formed, and the protrusions would seem to interfere with the gravure or silk screen printing process. Ink-jet printing method is indeed suitable for a process involving pre-formed partitions, but this is precisely what is disclosed in the present invention, and is found nowhere in the prior art. If the use of ink-jet printing appears "obvious", it is based on nothing other than knowledge and hindsight gleaned from the present invention itself. Absent some teaching or suggestion in the prior art, a case of obviousness cannot be made. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Therefore, the applicant respectfully submits that claim 37 and claims 38-54 that depend therefrom are patentable over the cited references.

Independent claim 56 similarly forming a partitioning member on a substrate; filling openings of the partitioning member with a composition for the hole injecting and transporting layer using an ink-jet recording head, and drying the composition filled in the openings to form the hole injecting and transporting layer. For similar reasons stated above, claim 56 is patentable over the cited references.

Claim 55 was rejected as being obvious over Liu in view of Cao, Jonas '515 and Tanigushi, and further in view of Itoh. This rejection is moot in view of the cancellation of this claim.

Finally, new claims 62 and 63 are patentable for the same reasons as those set forth above for claims 37 and 56, respectively.

Applicant believes the foregoing amendments place the application in condition for allowance and early favorable action is respectfully solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

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Version with markings to show changes made:

IN THE SPECIFICATION

On page 11, in the paragraph below the heading "BRIEF DESCRIPTION OF THE DRAWINGS":

[Fig. 1 is a sectional view of manufacturing steps for an organic EL element.]

Fig. 1A illustrates the formation of an anode on a glass substrate.

Fig. 1B depicts the formation of a partitioning member on the glass substrate shown in Fig. 1A.

Fig. 1C shows the discharge of a composition for forming a hole injecting and transporting layer onto the substrate of Figs. 1A and 1B.

Fig. 1D illustrates the discharge of a composition for forming a light-emitting layer over the hole injecting and transporting layer of Fig 1C.

Fig. 1E depicts the deposition of a cathode over the light-emitting layer of Fig. 1D.

IN THE CLAIMS

48. (Amended) The manufacturing process according to claim 45, wherein the polar solvent is a mixed solvent of water and at least one solvent selected from the group consisting of mono and dialkyl ethers of ethylene glycol [and their derivatives].

50. (Amended) The manufacturing process according to claim 37, [further comprising] wherein the composition further comprises a lubricant.

58. (Amended) A composition used for forming a pattern formation of a hole injecting and transporting layer of an organic EL element using an ink-jet recording head, the composition comprising at least a material for a hole injecting and transporting layer and a polar solvent as a solvent, the composition having a viscosity between 1 to 20 cps and a surface tension of 20 to 70 dyne/cm.